



Renewables Portfolio Standard Quarterly Report



July 2008



California Public Utilities Commission

ABOUT THE RPS AND THIS REPORT

California's Renewable Portfolio Standard (RPS) is one of the most ambitious renewable energy standards in the country

Established in 2002 under Senate Bill 1078 and accelerated in 2006 under Senate Bill 107, California's RPS obligates investor-owned utilities (IOUs), energy service providers (ESPs) and community choice aggregators (CCAs) to procure an additional 1% of retail sales per year from eligible renewable sources until 20% is reached, no later than 2010. The California Public Utilities Commission (CPUC) and California Energy Commission (CEC) are jointly responsible for implementing the program.

This report highlights:

- CPUC staff analysis of the state's 33% RPS goal
- The need for statewide leadership and coordination to reduce the barriers to renewable energy procurement


ADOPTING A MORE AGGRESSIVE RPS

A more aggressive RPS could be a key component of California's clean energy future

The CPUC and CEC, in their 2008 update to Energy Action Plan Update, committed "to working together to evaluate the potential for making 33 percent of the power delivered in California renewable by 2020".¹ A 33% goal could further California's efforts to address climate change and lead the nation in proactive clean energy policy. Because current RPS statute prevents the CPUC from requiring California's IOUs to procure more than 20% of their electricity from renewable sources, several parties have called for legislation to codify the 33% by 2020 target. The recent draft scoping plan released by the California Air Resources Board also included a 33% by 2020 RPS as one of the strategies needed to achieve our AB 32 goals.

If California is to adopt a 33% target, the state must examine its experience with the 20% RPS and apply lessons learned to any higher targets. Such an aggressive goal must be backed up by action and real progress, which means that California must effectively address the barriers hindering achievement of its 20% goal. Further, the magnitude of the 33% RPS implies costs, GHG emissions and new operating and planning challenges that are not yet fully understood. For these reasons, the CPUC believes that:

- 1.) A pragmatic, multi-agency assessment of implementation specifics is needed in conjunction with any target and timeline for moving beyond 20% renewables.



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¹ http://www.cpuc.ca.gov/NR/rdonlyres/58ADCD6A-7FE6-4B32-8C70-7C85CB31EBE7/0/2008_EAP_UPDATE.PDF

- 2.) The state should clearly articulate the rationale behind a more aggressive RPS. The overarching policy goal – greenhouse gas reductions, other environmental concerns, energy independence, economic development, etc – is likely to impact program design.

STATUS OF 20% BY 2010

The RPS procurement process appears effective, but actual renewable development is slow

Since the legislation adopting the RPS program was passed in 2002, the CPUC has approved 95 contracts for 5,900 MW for new and existing RPS-eligible capacity. Of these contracts, 61 are for new projects, totaling 4,480 MW. Were all this capacity to come online by 2010, we would more than achieve our RPS target. Furthermore, the response to RPS solicitations has been robust and increasing, one indication that the market is maturing. IOUs are finalizing the short-lists resulting from their 2008 solicitations for RPS-eligible energy, and will short-list for negotiation more than 10 times their annual incremental requirements. It appears, therefore, that the RPS procurement process is working.

Despite the increasing response to RPS solicitations and the large number of signed contracts, RPS progress, which is measured on the basis of eligible *delivered* energy, has been slow. Only 14 contracts for ~400 MW have come online; California's IOUs would need about 3,000 more new MW in next 2 years to be able to meet 20% in 2010. Overall, RPS generation has not kept pace with overall load growth, as demonstrated in Table 1.

IOUs will short-list for negotiation more than 10 times their annual incremental requirements. It appears that the RPS procurement process is working.

Table 1.²

		2003	2004	2005	2006	2007
PG&E	RPS Eligible GWh	8,828	8,575	8,543	9,114	9,047
	RPS GWh as % of bundled sales	12.4%	11.6%	11.7%	11.9%	11.4%
SCE	RPS Eligible GWh	12,613	13,248	12,930	12,706	12,465
	RPS GWh as % of bundled sales	17.9%	18.2%	17.2%	16.1%	15.7%
SDG&E	RPS Eligible GWh	550	678	825	900	881
	RPS GWh as % of bundled sales	3.7%	4.3%	5.2%	5.3%	5.2%
TOTAL	RPS Eligible GWh	21,991	22,500	22,298	22,719	22,393
	RPS GWh as % of bundled sales	14.0%	13.9% ↓	13.6% ↓	13.2% ↓	12.7% ↓

WHAT DOES THIS TABLE SHOW?

- RPS-eligible renewable generation declined for all IOUs between 2006 and 2007
- As a percentage of bundled electricity sales, total IOU RPS-eligible generation declined each year from 2004 to 2007

² Sources: IOUs' March 26, 2008 RPS compliance filings; CEC's Renewables Portfolio Standard 2005 Procurement Verification Report (<http://www.energy.ca.gov/2007publications/CEC-300-2007-001/CEC-300-2007-001-CMF.PDF>)

What is driving the decline in RPS percentages? Which types of renewable generation are increasing?

As discussed below, project development barriers are contributing to the slow overall growth in RPS generation. IOU RPS-eligible generation did increase by about 400 GWh between 2003 and 2007, driven by new wind development and new IOU contracts with existing geothermal facilities. Because this overall increase was very small, however, it was outstripped by load growth over the same time period, and IOU RPS GWh as a percentage of bundled sales declined from 14.0% to 12.7%. *Barriers to project development must be addressed if we are to see a long-term upward trend in RPS generation as a percent of bundled sales.*

In the short-term, however, existing RPS generation is variable. Because renewable energy is dependent on the sun, wind, and water, year-to-year variation in weather patterns can have a significant impact on year-on-year changes in RPS numbers. For example, the decline in IOU RPS generation between 2006 and 2007 was due, in large part, to lower-than expected generation from RPS-eligible small hydro facilities: reported generation from small and conduit hydro facilities under contract to the IOUs declined by about 60% between 2006 and 2007. Had small hydro generation remained constant between 2006 and 2007, the IOUs would have collectively served about 24,000 GWh – approximately 13.7% – of their load with RPS-eligible renewables. The CPUC expects that 2008 may also be a dry hydro year, contributing to relatively low 2008 RPS statistics.

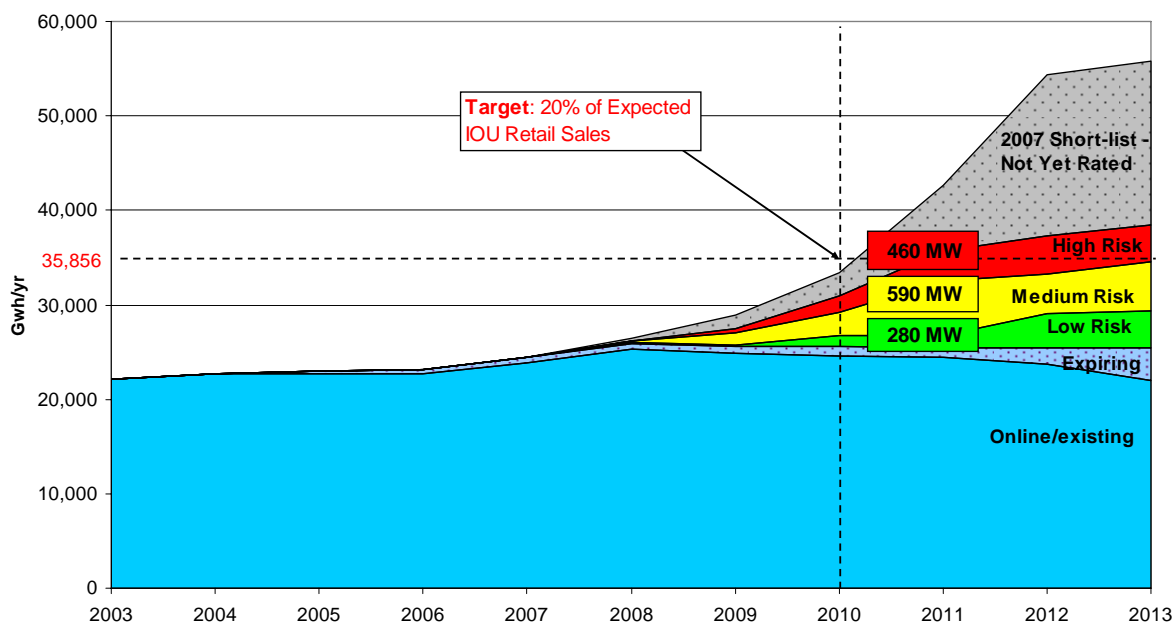
ADDRESSING RPS PROJECT DEVELOPMENT RISK

The risk associated with expected RPS generation

As described in previous reports to the Legislature, CPUC staff works to evaluate the risk associated with contracts approved by the CPUC, pending approval at the CPUC, and under negotiation at the IOUs. Staff rates the risk associated with each project's generation of RPS-eligible energy each year from its expected online date through contract expiration. Expected generation is visually coded green (low risk), yellow, or red (high risk), depending on the risk that that RPS project will not be online and delivering energy that year. Figure 1 represents the CPUC's current risk analysis. Generation from most projects resulting from the IOUs' 2007 Requests for Offers and some ongoing bilateral negotiations is not yet rated, as it is difficult to accurately identify risks specific to such early-stage projects. Potential generation from these projects is included on the graph, however, for illustrative purposes. In addition, the IOUs are now finalizing their short-lists from the 2008 RPS solicitation; these short-listed projects will add more generation to the forecast below, although few projects from that solicitation could come online before 2012 or 2013.

Figure 1.

IOU Expected RPS Generation and Risk



WHAT DOES THIS GRAPH SHOW?

- If the state successfully removes barriers to project development, California IOUs would be on target to hit 20% in the 2012-2013 timeframe
- Projects short-listed after the 2007 RPS solicitation are still under negotiation and may or may not receive contracts; projects short-listed after the 2008 solicitation could provide significant generation in 2011 and beyond, but have not yet been added to the graph

Compared to the version of this chart that was included in our April Report to the Legislature, Figure 1 shows that IOUs are now projected not to meet the 20% by 2010 target, even if all of the 2010 generation that is now rated medium or high risk or under negotiation, were to come online by that year. This change is due to two factors: the 2010 target has been adjusted upwards to reflect the most recent demand forecast adopted by the CEC in its 2007 IEPR; and CPUC staff has pushed back the dates by which it expects several RPS projects to come online. CPUC staff made these forecast adjustments in light of project delays due to military radar conflicts, site control difficulties, transmission delays, and other concerns.

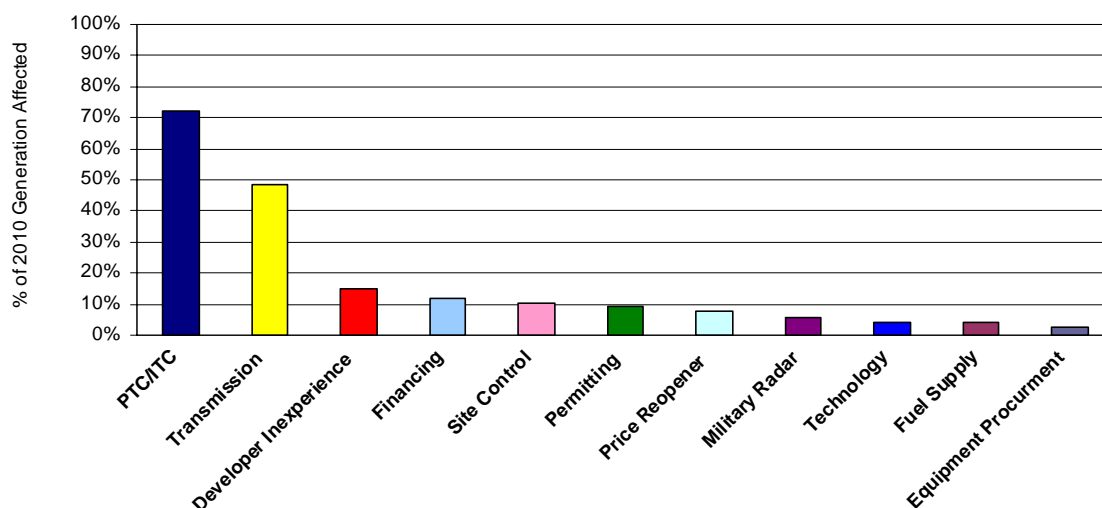
As Figure 1 demonstrates, California's IOUs may hit 20% in the 2012-2013 timeframe, if the state successfully removes barriers to project development. It is worth noting that reaching the 20% goal in 2013 would leave the IOUs only 7 years to achieve the 60% increase in RPS generation needed to reach a 33% target in 2020.

CPUC work to create multi-agency solutions to known 20% RPS barriers

Through its work to evaluate the risk facing individual RPS projects, the CPUC has identified several barriers to RPS development. Figure 2, below, included in the April Report to the Legislature, demonstrates what percentage of expected new 2010 RPS generation is at risk due to a number of possible risk factors.

Figure 2.

Risk Factors for 2010 RPS Generation



WHAT DOES THIS GRAPH SHOW?

- Potential expiration of the Production and Investment Tax Credits and access to transmission are the main risk factors for RPS projects scheduled to be online by 2010.
- At least 5 different risk factors affect more than 10% of RPS generation.
- Many risk factors affecting RPS generation are not within the control of the CPUC alone and require inter-agency action for solutions.

Possible expiration of the federal Production and Investment Tax Credits is the number one source of risk to new RPS generation expected to come online by 2010. Unfortunately, this is also the area of risk over which the state of California has the least control.

The remaining sources of risk identified in Figure 2 require state-wide, inter-agency solutions – they are not within the control of the CPUC alone. The CPUC has thus begun working with relevant agencies to create solutions to these known sources of risk. In the case of transmission, for example, the CPUC continues to streamline its transmission permitting process; it initiated, in collaboration with other state agencies and stakeholders, the Renewable Energy Transmission Initiative;³ and it is working closely with the

³ <http://www.energy.ca.gov/reti/>

The CPUC continues to streamline its transmission permitting process; it also initiated, in collaboration with other state agencies and stakeholders, the Renewable Energy Transmission Initiative.

California Independent System Operator (ISO) on reform of the interconnection process. Regarding the difficulty several generation facilities face in securing sites and relevant permits, the CPUC has initiated discussions with the Bureau of Land Management, the CEC, and other federal, state and local agencies about aligning processes and sharing information where such coordination can lend efficiency.

The efforts described above are relatively young, and it remains to be seen how effective they will be at removing project development barriers and quickly “ramping-up” California’s renewable generation to meet our 20% by 2010 target. It is clear, however, that California needs to find solutions to these barriers if it is to facilitate development on the scale and timeline needed for a 33% RPS. *Statewide coordination and focused leadership is needed to address these challenges.*

ACHIEVING A 33% RPS REQUIREMENT – SHIFTING THE PARADIGM

The magnitude of a 33% RPS for all California LSEs must be acknowledged

Serving 33% of California’s electricity needs with renewable sources will require an infrastructure build-out on a scale and timeline perhaps unparalleled anywhere in the world. Energy and Environmental Economics, Inc. (E3), a consulting firm that recently completed modeling work for the CPUC on achieving greenhouse gas reductions from the electricity sector, has estimated the energy, capacity and transmission requirements possible under a 20% by 2010 and a 33% by 2020 RPS for all California load serving entities (LSEs: IOUs, small and multi-jurisdictional utilities, ESPs, CCAs, and municipal utilities).

<i>One scenario for achieving a 20% by 2010 RPS would require:</i>	
29,000 GWh of new renewable energy in 2010, in addition to 31,000 GWh of generation from renewables in existence today	
2 New Major Transmission Lines (6,700 MW) at cost of \$3.5 Billion	
<i>One scenario for a 33% by 2020 RPS (starting today and using primarily in-state resources) would require:</i>	
70,000 GWh of new renewable energy in 2020, in addition to 31,000 GWh of generation from renewables in existence today	
7 New Major Transmission Lines (15,900 MW) at cost of \$6.4 Billion	

It is important to note that the 33% by 2020 scenario modeled above is only one possible scenario for reaching that target. Among other things, the scenario assumes that few out-of-state resources contribute to the RPS target; this assumption may not lead to the least cost, best fit solution. Efforts such as RETI and the long-term portfolio analysis under development in the CPUC’s long-term procurement plan proceeding⁴ will help to identify the least-cost, best-fit options for reaching California’s clean energy goals.

⁴ CPUC Proceeding: R.08-02-007; http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/78966.pdf

Achieving 33% RPS will require careful transmission and resource planning and coordination

The generation needed to reach a 33% RPS by 2020 will face the same barriers already slowing progress to the 20% target – transmission, site control, permitting, developer inexperience, etc. – *but on a much larger scale*. In addition, the CPUC anticipates that a 33% goal will bring new challenges, including:

- *transmission grid reliability and integration;*
- *increasing renewable generation costs; and*
- *the need for a paradigm shift in procurement and transmission planning.*


Transmission grid reliability and integration

Flexible fossil, dispatchable demand response and/or storage will be needed to provide ramp and regulation services to integrate intermittent resources. Solar resources generally follow load in California more closely than wind, but they do not follow load perfectly and will still require integration. The California ISO has not yet studied the operating needs – and thus the costs – of integrating 33% renewable energy, but it has stated that the costs, relative to the levels of renewable penetration, cannot be assumed to be linear. Reliability implications must also be considered, given once-through cooling restrictions, local air permitting requirements and other restrictions that may limit the state's ability to maintain existing fossil resources and site new flexible fossil facilities.

Increasing renewable generation costs

Construction costs are increasing for both renewable and conventional generation, and the RPS program has seen a rise in bid and contract prices since the program began in 2002. There is a concern that constrained supply and policy-driven demand are driving up the costs of RPS contracts, but a shifting resource mix is also responsible. Response from geothermal and biomass generators to recent IOU requests for offers of RPS generation has been small relative to other resources. IOUs have seen an increase in response from developers of solar thermal and solar photovoltaic energy, and these facilities have relatively high installation costs and significant permitting challenges.

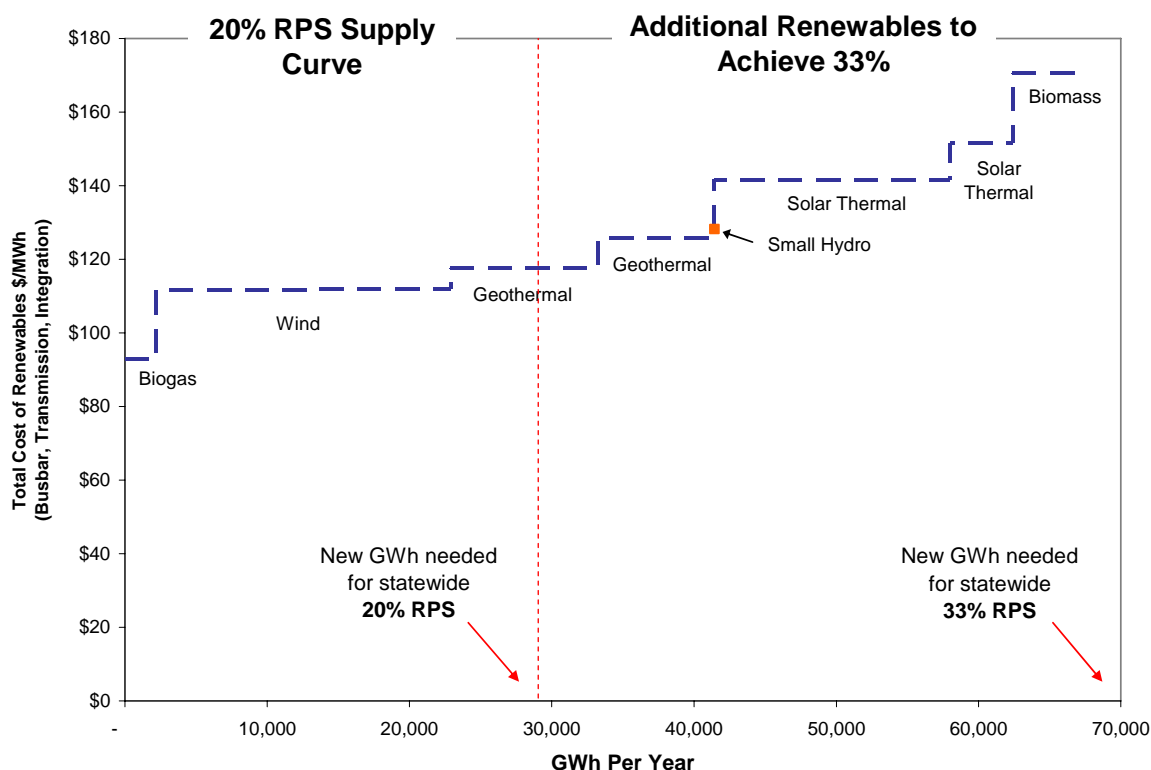
While California has vast untapped renewable potential, many of the state's lowest cost resources – the low-hanging fruit – have already been developed. California must consider whether a 33% by 2020 mandate may accelerate the increasing costs of large scale renewable procurement, and what impacts such increases may have on ratepayers. Reaching a 33% target will require the procurement of more expensive renewables. Preliminary analysis by E3 indicates that such a target may require a state investment of about \$60 billion in generation and transmission. Under such circumstances, the policy driver behind the RPS target becomes important: if the overarching goal is GHG reductions, for example, rather than local economic development, it may be prudent to procure a larger proportion of their renewable energy from out-of-state resources, if those resources are found to be more cost-effective than in-state resources.



Flexible fossil, dispatchable demand response and/or storage will be needed to provide ramp and regulation services to integrate intermittent resources.

Figure 3, below, illustrates E3's analysis of the estimated total costs per MWh of the resources needed to meet statewide 20% by 2010 and 33% by 2020 goals under the scenario described on page 8 of this report. As the chart illustrates, expanding our reliance on renewable energy will likely require the procurement of resources with increasing total costs.

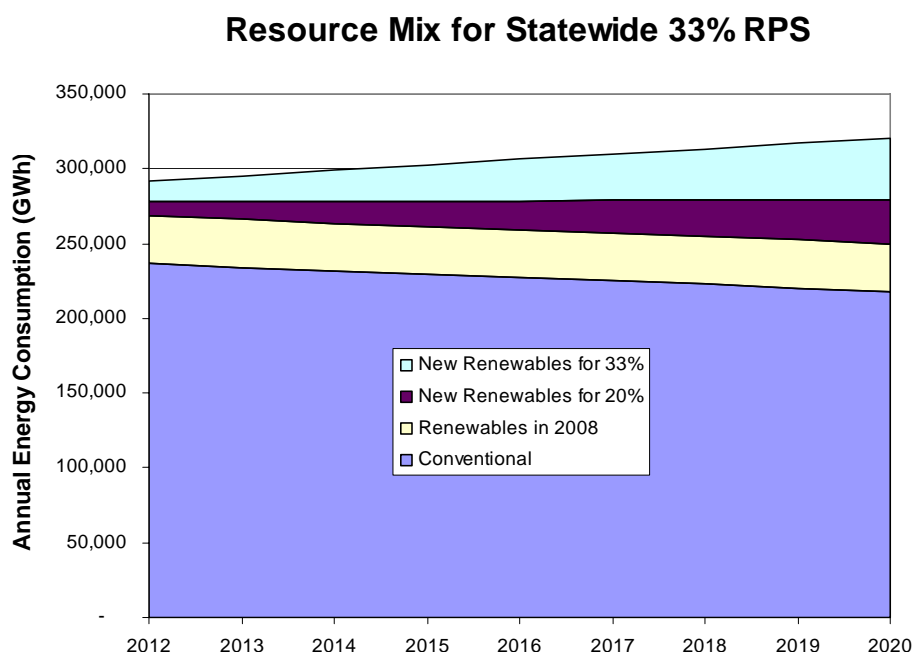
Figure 3.



Paradigm shift needed in procurement and transmission planning

As shown in Figure 4, E3's modeling indicates that achievement of a 33% by 2020 RPS would reduce generation from non-renewable resources by 11% in 2020. Such a result would require that nearly all new procurement be renewable. Under a new, RPS-driven procurement paradigm, fossil procurement and transmission planning would be oriented towards enabling ever-increasing levels of renewable penetration. Such a paradigm shift in system planning and operations will require focused effort and coordination on the part of multiple entities, including the CPUC, the CEC, the ISO, and LSEs.

Figure 4.



WHAT DOES THIS GRAPH SHOW?

- Achievement of a 33% by 2020 RPS would reduce generation from non-renewable resources by 11% in 2020.
- Fossil procurement undertaken today must be oriented towards enabling ever-increasing levels of renewable generation.

THE GOAL OF A 33% RPS MUST BE CLEAR

Given the associated challenges and possible costs, the aim of a 33% RPS must be clear

California must be clear about the goal of a 33% RPS – whether it is to promote broad environmental and economic development benefits of renewables, to “move the renewables market”, to reduce greenhouse gases, or some combination thereof. If the main driver of a 33% RPS is reduction of greenhouse gases, the state must consider the GHG impact of the transmission development and the possible fossil resources needed to integrate such a large build-out of renewable generation. California would then want to choose the most cost effective resources for meeting its GHG reduction measures, whether in-state or out-of state renewables, demand response, energy efficiency, fossil repowers, or other options. An integrated approach to procurement and transmission planning can best consider the costs and benefits of these options. The CPUC is developing a long-term portfolio analysis methodology for the IOUs’ 2010 long-term procurement plans that seeks to provide this analysis.

RPS POLICY REFORM – SUMMARY OF KEY RECOMMENDATIONS

California should continue to lead the nation in proactive clean energy policy, and a more aggressive RPS could be key to that leadership. Existing barriers to today's 20% by 2010 RPS must be effectively addressed in order to ensure real action and progress toward a more ambitious target. The CPUC thus recommends that relevant entities focus on removing barriers and making progress toward additional renewables.

To ensure that we meet our overarching policy goals in the most efficient manner, the purpose (GHG reductions, other environmental benefits, economic development, energy independence, etc.) of any additional RPS mandate must be clear. Once that purpose is identified, a portfolio-wide planning approach that considers, for example, the implications of renewable procurement on fossil procurement, would be well-suited to helping the state achieve a cleaner statewide energy portfolio in the most cost-effective manner.